

Ethyleneimine oligomer treatment of DBA/2 cells results in inhibition of splenomegaly and a decrease in generalized immunoglobulin production as compared to untreated controls.

The effect of ethyleneimine oligomer treatment on the ability to induce IgG alloantibody responses to donor antigens is also examined using C57BL/6 donor cells and DBA/2 recipients.

5 The results from three studies are presented in Table 5:

Table 5

| Trial | IgG Alloantibody Levels |                        |
|-------|-------------------------|------------------------|
|       | Control                 | Ethyleneimine Oligomer |
| 1     | 130±49                  | -7±6                   |
| 2     | 128±22                  | -8±3                   |
| 3     | 203±70                  | 4±7                    |

Treatment of donor cells with ethyleneimine oligomer results in significantly lower levels of IgG alloantibodies.

These results demonstrate that ethyleneimine oligomer treatment of allogeneic donor lymphoid cells interferes with both the in vivo ability of the donor cells to respond and the in vivo ability of the donor cells to induce recipient immune responses.

15 Other embodiments are within the claims.



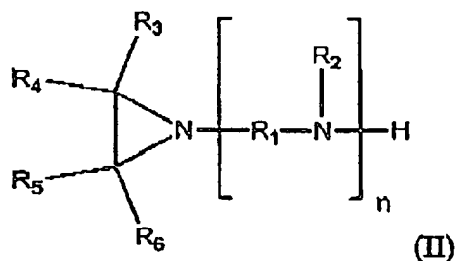
What is claimed is:

1. A method for treating a patient having an immune dysfunction, said method comprising the steps of:

- 5 (a) treating peripheral blood mononuclear cells with an effective amount of an aziridino-containing compound; and
- (b) administering said peripheral blood mononuclear cells to said patient.

2. The method of claim 1, wherein said immune dysfunction is cutaneous T-cell lymphoma, graft versus host disease, allograft rejection following organ transplantation, 10 systemic lupus-erythematosus, systemic sclerosis, inflammatory bowel disease, or rheumatoid arthritis.

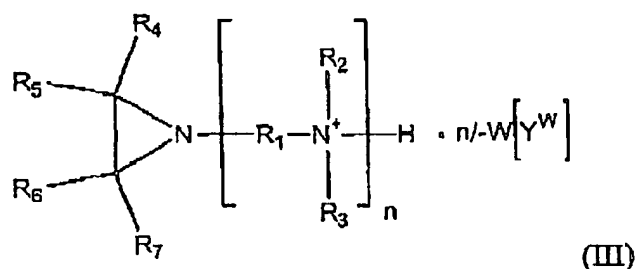
3. The method of claim 1 wherein said compound has the formula (II):



wherein each  $\text{R}_1$  is a divalent hydrocarbon moiety containing between 2 and 4 carbon atoms, inclusive; each of  $\text{R}_2$ ,  $\text{R}_3$ ,  $\text{R}_4$ ,  $\text{R}_5$ , and  $\text{R}_6$  is, independently, H or a monovalent hydrocarbon moiety containing between 1 and 4 carbon atoms; and  $n$  is an integer between 1 and 10, 20 inclusive.

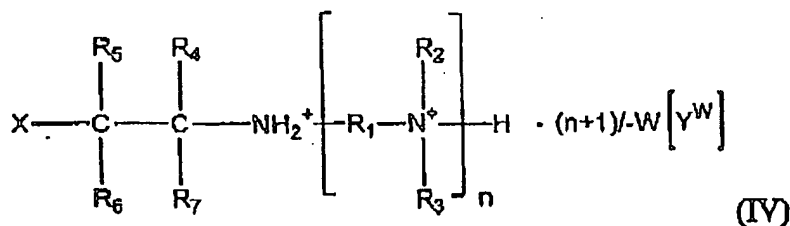
4. The method of claim 1, wherein said compound is ethyleneimine dimer.

5. The method of claim 1, wherein said compound is an ethyleneimine trimer.
6. The method of claim 1, wherein said compound is an ethyleneimine tetramer.
7. The method of claim 1, wherein said compound has the formula (III):



wherein each  $R_1$  is a divalent hydrocarbon moiety containing between 2 and 4 carbon atoms, inclusive; each of  $R_2$ ,  $R_3$ ,  $R_4$ ,  $R_5$ ,  $R_6$ , and  $R_7$  is, independently, H or a monovalent hydrocarbon moiety containing between 1 and 4 carbon atoms; X is Cl or Br, Y is a pharmaceutically acceptable counter anion; W is valency of Y; and n is an integer between 1 and 10, inclusive.

8. The method of claim 1, wherein said compound has the formula (IV);



wherein each  $R_1$  is a divalent hydrocarbon moiety containing between 2 and 4 carbon atoms, inclusive; each of  $R_2$ ,  $R_3$ ,  $R_4$ ,  $R_5$ ,  $R_6$ , and  $R_7$  is, independently, H or a monovalent hydrocarbon

moiety containing between 1 and 4 carbon atoms; X is Cal or Br; Y is a pharmaceutically acceptable counter anion; W is valency of Y; and n is an integer between 1 and 10, inclusive.

9. A method for treating a patient having an immune dysfunction, said method  
5 comprising the steps of:

(a) extracorporeally treating peripheral blood mononuclear cells from said patient with an effective amount of an aziridino-containing compound;

(b) separately said peripheral blood mononuclear cells from said aziridino-containing compound; and

(c) administering said peripheral blood mononuclear cells to said patient.

10. A method for preventing graft-versus-host (GVH) disease in a patient, the method comprising the steps of:

(a) extracorporeally treating a blood composition with an effective amount of an aziridino-containing compound; and

(b) administering said treated blood cell population to said patient, thereby preventing GVH disease in said patient.

11. The method of claim 10, wherein said blood composition comprises peripheral blood  
20 mononuclear cells (PBMC).

12. The method of claim 10, wherein said blood composition is a non-leukoreduced blood cell concentrate.

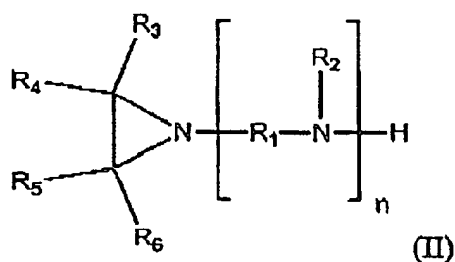
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13. The method of claim 10, wherein said blood composition is a heterologous blood cell population.

14. The method of claim 10, wherein said method further separating said aziridino-containing compound from said treated blood cell composition prior to administering said treated blood composition to said patient.

15. The method of claim 14, wherein at least 99% of said aziridino-containing compound is removed from said treated blood cell composition prior to administering said treated blood composition to said patient.

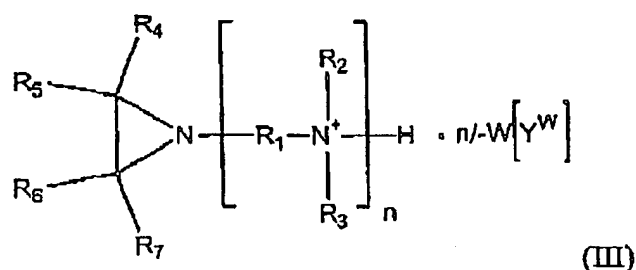
16. The method of claim 10, wherein said compound has the formula (II):



wherein each  $R_1$  is a divalent hydrocarbon moiety containing between 2 and 4 carbon atoms, inclusive; each of  $R_2$ ,  $R_3$ ,  $R_4$ ,  $R_5$ , and  $R_6$  is, independently, H or a monovalent hydrocarbon moiety containing between 1 and 4 carbon atoms; and  $n$  is an integer between 1 and 10, inclusive.

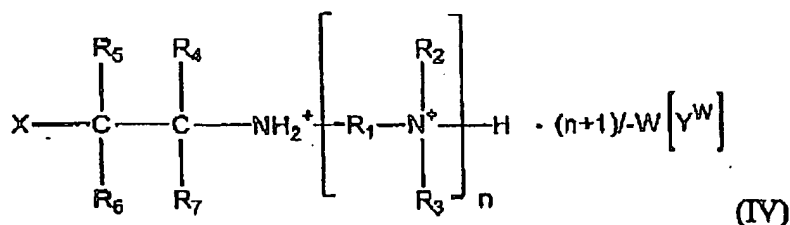
17. The method of claim 10, wherein said compound is an ethyleneimine dimer.

18. The method of claim 10, wherein said compound is an ethyleneimine trimer.
19. The method of claim 10, wherein said compound is an ethyleneimine tetramer.
20. The method of claim 10, wherein said compound has the formula (III):



wherein each  $R_1$  is a divalent hydrocarbon moiety containing between 2 and 4 carbon atoms, inclusive; each of  $R_2$ ,  $R_3$ ,  $R_4$ ,  $R_5$ ,  $R_6$ , and  $R_7$  is, independently, H or a monovalent hydrocarbon moiety containing between 1 and 4 carbon atoms; X is Cl or Br, Y is a pharmaceutically acceptable counter anion; W is valency of Y; and n is an integer between 1 and 10, inclusive.

21. The method of claim 10, wherein said compound has the formula (IV);



wherein each  $R_1$  is a divalent hydrocarbon moiety containing between 2 and 4 carbon atoms, inclusive; each of  $R_2$ ,  $R_3$ ,  $R_4$ ,  $R_5$ ,  $R_6$ , and  $R_7$  is, independently, H or a monovalent hydrocarbon

moiety containing between 1 and 4 carbon atoms; X is Cal or Br; Y is a pharmaceutically acceptable counter anion; W is valency of Y; and n is an integer between 1 and 10, inclusive.

22. The method of claim 10, wherein said patient is a human.

23. The method of claim 10, wherein said patient suffers from or is at risk for immune dysfunction.

24. The method of claim 22, wherein said human patient suffers from or is at risk for immune dysfunction.

25. A method for preventing graft-versus-host (GVH) disease in a patient, the method comprising the steps of:

(a) treating a heterologous blood composition with an effective amount of an ethylene oligomer compound;

(b) removing said ethylene oligomer from said heterologous treated blood composition; and

(c) administering said treated blood cell population to said patient, thereby preventing GVH disease in said patient.

26. The method of claim 25, wherein said patient is a human.

27. The method of claim 25, wherein said compound is an ethyleneimine dimer.

28. The method of claim 25, wherein said compound is an ethyleneimine trimer.

29. The method of claim 25, wherein said compound is an ethyleneimine tetramer.

5 30. A method for treating graft-versus-host (GVH) disease in a patient, the method comprising the steps of:

(a) treating a heterologous blood composition with an effective amount of an aziridino-containing compound; and

(b) administering said treated blood cell population to said patient,  
10 thereby treating GVH disease in said patient.

31. A method for preventing graft-versus-host (GVH) disease in a patient, the method comprising the steps of:

(a) treating a heterologous blood composition with an effective amount of an ethylene oligomer compound;

(b) removing said ethylene oligomer from said heterologous treated blood composition;  
15 and

(c) administering said treated blood cell population to said patient,  
20 thereby preventing GVH disease in said patient.

32. A method for preventing an alloantibody response in a patient, the method comprising the steps of:



(a) treating a heterologous blood composition with an effective amount of an aziridino-containing compound; and

(b) administering said treated blood cell population to said patient, thereby preventing said alloantibody response in said patient.

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33. A method for functionally inactivating a leukocyte in a patient, the method comprising the steps of:

(a) treating a heterologous blood composition comprising a leukocyte with an effective amount of an aziridino-containing compound; and

(b) administering said treated blood cell population to said patient, thereby inactivating said leukocyte in said patient.

34. The method of claim 33, wherein said leukocyte renders does not proliferate following said treatment.

35. A blood composition produced by treating a composition comprising peripheral blood mononuclear cells with a non-viricidal amount of an aziridino-containing compound, wherein said aziridino-containing compound is present in an amount sufficient to inhibit proliferation of said peripheral blood mononuclear cells.

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